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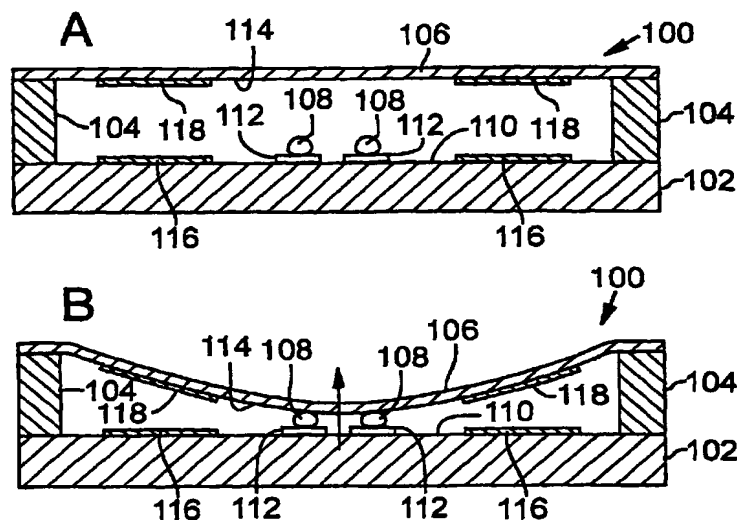
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(54) Title: THERMAL SWITCH, METHODS OF USE AND MANUFACTURING METHODS FOR SAME



(57) Abstract: The present invention concerns embodiments of a thermal switch used to control the transfer of heat from a heat source to a heat sink. According to one aspect, the thermal switch (Fig. 6a-6b) can be activated, or turned "on" (Fig. 6b), so as to establish a path of low thermal resistance between the heat source (106) and the heat sink (102) to facilitate the transfer of heat therebetween. The thermal switch can also be de-activated, or turned "off" (Fig. 6a), so as to establish a path of high thermal resistance between the heat source (106) and the heat sink (102) to minimize or totally prevent the transfer of heat between the heat source (106) and heat sink (102). In certain embodiments, the thermal switch includes at least drop of a thermally conductive liquid (108) that thermally couples the heat source (106) to the heat sink (102) whenever the switch is activated.

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/36869

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A. CLASSIFICATION OF SUBJECT MATTER

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According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : Please See Continuation Sheet

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

Please See Continuation Sheet

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6,437,240 B2 (SMITH) 20 August 2002 (20.08.2002), Fig. 25	1-3, 33-36
Y	US 6,191,944 B1 (HAMMEL et al) 20 February 2001 (20.02.2001) see entire document.	43
X	US 5,379,601 A (GILLET) 10 January 1995 (10.01.1995), Fig. 2a-2c	1-27, 33-36, 39-41
Y		28-32, 37-39, 42, 43
A, E	US 2003/0,230,403 A1 (WEBB) 18 December 2003 (18.12.2003) see entire document.	1-43
A	US 4,092,697 A (SPAIGHT) 30 May 1978 (30.05.1978) see entire document.	1-43
A	US 5,808,874 A (SMITH) 15 September 1998 (15.09.1998) see entire document.	1-43
A	US 6,392,890 B1 (KATCHMAR) 21 May 2002 (21.05.2002) see entire document.	1-43
A	US 4,742,867 (WALSH) 10 May 1988 (10.05.1988) see entire document.	1-43



Further documents are listed in the continuation of Box C.



See patent family annex.

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"A"	document defining the general state of the art which is not considered to be of particular relevance	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
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INTERNATIONAL SEARCH REPORT

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C. (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 6,351,952 B1 (BAKER, III) 5 March 2002 (5.03.2002) see entire document.	1-43
A	US 3,643,734 (DESCHAMPS) 22 February 1972 (22.02.1972) see entire document	1-43
A	US 4,858,678 (LADD) 22 August 1989 (22.08.1989) see entire document.	1-43
A	US 5,170,930 A (DOLBEAR et al) 15 December 1992 (15.12.1992) see entire document.	1-43
A	US 4,212,346 (BOYD) 15 July 1980 (15.07.1980) see entire document.	1-43
A,E	US 6,665,186 B1 (CALMIDI et al) 16 December 2003 (16.12.2003) see entire document.	1-43
A	US 6,281,573 B1 (ATWOOD) 28 August 2001 (28.08.2001) see entire document.	1-43
A	US 5,459,352 A (LAYTON et al) 17 October 1995 (17.10.1995) see entire document.	1-43
A	US 3,519,067 (R.N.SCHMIDT) 07 July 1970 (07.07.1970) see entire document.	1-43
A	US 4,129,881 (REICHEL et al) 12 December 1978 (12.12.1978) see entire document.	1-43
A	US 4,254,431 (BABUKA et al) 03 March 1981 (03.03.1981) see entire document	1-43

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Continuation of B. FIELDS SEARCHED Item 1:

337/ 80,36,37,51, 114, 116, 117, 139, 331, 373; 361/704-712, 717-719, 722; 165/84, 86, 96, 80.3, 104.11, 104.19, 104.28, 146, 185;
60/527, 529-531; 62/383; 257/705-707, 713, 717-719

Continuation of B. FIELDS SEARCHED Item 3:

EAST, search terms: thermal switch, heat valve, heat switch, variable thermal conductivity, heat sink, liquid metal, mems, droplet, mercury, heat spreader, interface, heat exchange